paediatric watch
Lessons from the frontline
Edition 2/2021

Common misses and misconceptions in paediatric sepsis

Despite advances in prevention and treatment of invasive bacterial infections, sepsis remains a leading cause of childhood morbidity and mortality in Australia.[1] The mortality rate for untreated septic shock is more than 80% in children, and even with treatment it is estimated at 15-20%.[1]

In Australia each year 50 infants and children (excluding neonates) die as a result of sepsis, and 500 children require admission to an Intensive Care Unit.

On review of serious clinical incidents reported in IIMS and ims+ between 2017-2020 several common misses and misconceptions related to the delay in recognition and management of sepsis in children and infants were identified. These included:

"The child has been persistently tachycardic however they don't seem to be getting worse…"

Persistent tachycardia: It is not uncommon for children who are unwell to be tachycardic, particularly when they are febrile. Children who remain tachycardic, even when their temperature subsides, should be reassessed to exclude sepsis as a cause of their illness. Persistent tachycardia remains one of our most valuable signs in identifying sepsis in children. In fact, an isolated persistent tachycardia may be the only early sign of sepsis. Never ignore or dismiss an unexplained persistent tachycardia, and do not discharge a child home with a heart rate in the Red Zone.

"If the temperature comes down after the Paracetamol, they should be OK to be discharged home…"

Fever response to antipyretics: This is not a diagnostic tool and the *'problem'* doesn't go away just because the fever does. A drop in a child's temperature following an antipyretic does not mean the cause is likely to be less serious. Neonates less than 28 days with a temperature > 38°C should be admitted, have a full septic work up and treated with empiric antibiotics.[2]

"There is no need for a septic workup, the baby is not febrile."

Absence of fever: Not all children with sepsis will have a fever on arrival to the emergency department or paediatric unit. Some children, in particular neonates and the immunocompromised, may have a normal temperature or be hypothermic which is also a red flag. Neonates and infants with sepsis commonly present with non-specific signs and symptoms, such as irritability, apnoea's or feeding difficulties.

"We have already started the antibiotics; we can transfer them to the ward."

The sepsis bundle includes more than just antibiotics: The Clinical Excellence Commission's (CEC) Paediatric Sepsis Pathway[3] recommends administration of antibiotics within 60 minutes of sepsis recognition. It is important to remember some children may continue to deteriorate following commencement of antibiotics. As per the Paediatric Sepsis Pathway[3] it is critical to restore normal circulating volume and physiological parameters. Initial fluid resuscitation of 20mL/kg 0.9% sodium chloride bolus must be administered STAT.[3] Inotropes may be required when normal physiological parameters are not restored after administration of more than 40mL/kg of fluids or anytime hypotension is present.

"I'm not convinced this child's lactate is really 4.2mmol/L…"

Elevated lactate – false attribution: An elevated lactate may be attributed to a difficult sample and therefore ignored. A lactate ≥ 4 mmol/L is a Red Zone Rapid Response trigger and must be escalated to a senior clinician as per local Clinical Emergency response System (CERS) and the blood test repeated. A lactate ≥ 2 mmol/L must also be escalated to a senior clinician as per the Paediatric Sepsis Pathway.[3] In either situation, think sepsis and commence the child on the Paediatric Sepsis Pathway.[3] If the child is

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unwell and has a known or suspected infection, sepsis treatment should be commenced without waiting for the lactate result. The CEC Lactate Information Sheet provides more information on lactate and the deteriorating patient.

Red flags in sepsis requiring escalation in care to NETS or an Intensive Care Unit:[3,4]

- Signs of shock persisting despite 40mL/kg fluid
- Lactate ≥ 4mmol/L
- Neutropenia (<1000/m^3) unrelated to chemotherapy
- Pain or distress disproportionate to clinical findings
- Coagulopathy/DIC
- Inotrope requirement
- Decreased level of consciousness
- Large pleural effusion (near white out of the hemithorax)

"The baby's perfusion is looking better after that bolus, they should be able to manage this on the ward."

Initial improvement in observations does not mean they are not at risk of deterioration: Children with sepsis often can compensate well and may improve following the first bolus initially. Hypotension is a late sign of shock in children. A common pitfall in the recognition of shock is attributing difficulty obtaining a blood pressure (BP) to technical issues rather than recognising the presence of hypotension. In other words, a BP is hard to obtain if it is barely there. Always escalate concern to the Attending Medical Officer/Paediatrician/NETS as per your local CERS. The child may require transfer to a higher-level facility and/or commencement of inotropes or invasive ventilatory support. Remember, airway protection must be considered in the child with a reduced level of consciousness and suspected sepsis.

"The child's respiratory rate and pain must be related to the virus or fever…"

If you can't explain it, consider sepsis: Tachypnoea may reflect compensation for a metabolic acidosis and be a sign of developing sepsis. Consider sepsis in a child with pain or distress that cannot be explained and is disproportionate to clinical findings. Many survivors of sepsis, particularly children, describe having unexplained moderate to severe limb pain prior to the diagnosis being made. Both these signs should be escalated to a senior doctor for expert review.

"The child's symptoms and abnormal observations are likely due to COVID-19"

Avoid COVID blindness: The potential for error and bias is heightened during uncertain times such as a pandemic. It is important to not fixate solely on a child's COVID-19 status without considering a differential diagnosis. This can lead to a loss of situational awareness and failure to recognise deterioration. This is known as COVID-19 blindness. We know that many patients who are COVID-19 positive can develop sepsis and it is essential to not lose sight of the overall picture. It is important to recognise that in high pressure situations, such as the current pandemic, the risk of human error increases. This is explained by the science of Human Factors. More information about Human Factors and strategies to reduce human error can be found on the CEC Human Factors web page.

References

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